FIG. 1

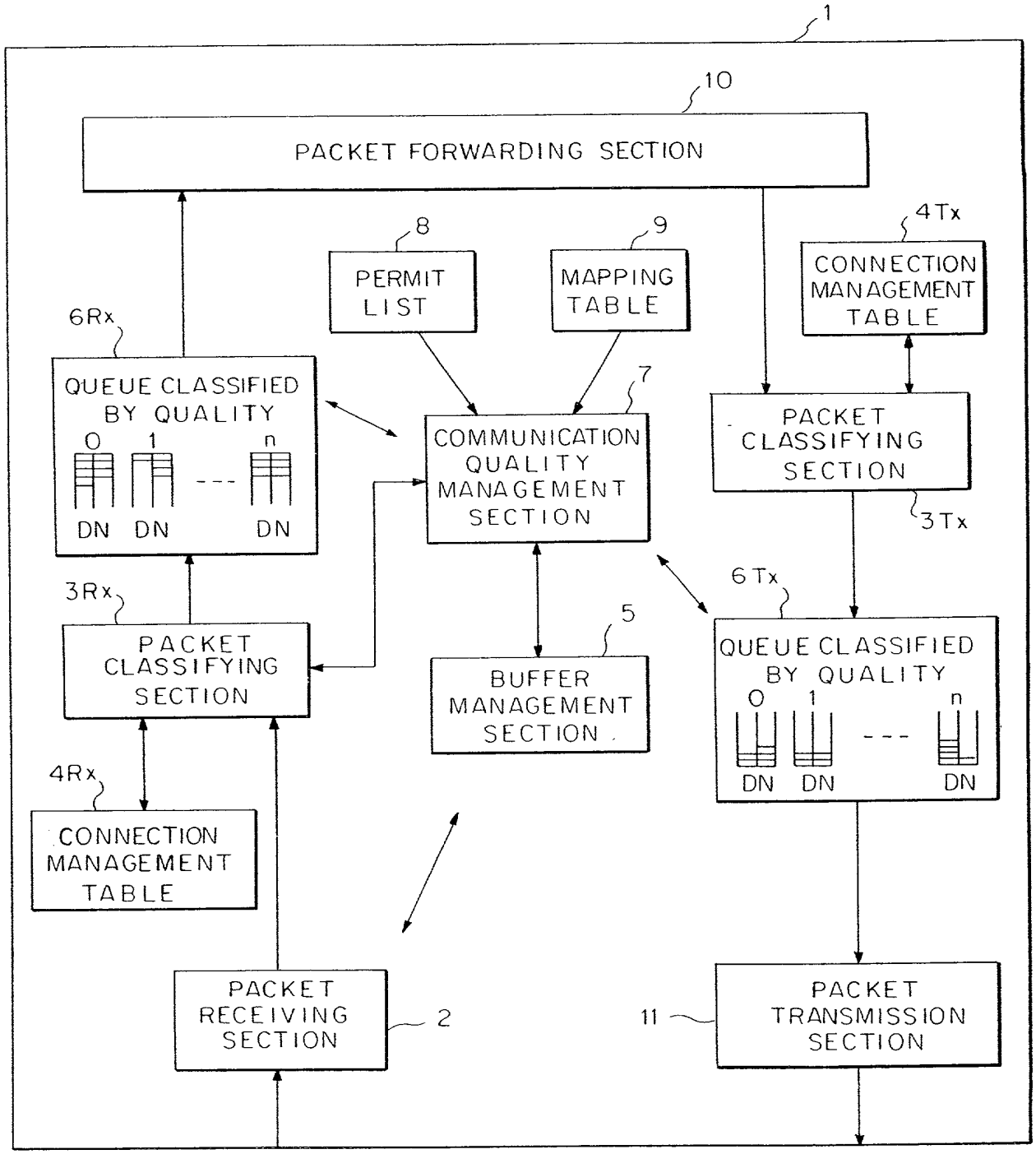

1
10
PACKET FORWARDING SECTION
8
PERMIT LIST
9
MAPPING TABLE
4Tx
CONNECTION MANAGEMENT TABLE
6Rx
QUEUE CLASSIFIED BY QUALITY
0
1
n
DN
DN
DN
7
COMMUNICATION QUALITY MANAGEMENT SECTION
PACKET CLASSIFYING SECTION
3Tx
3Rx
PACKET CLASSIFYING SECTION
5
BUFFER MANAGEMENT SECTION
6Tx
QUEUE CLASSIFIED BY QUALITY
0
1
n
DN
DN
DN
4Rx
CONNECTION MANAGEMENT TABLE
PACKET RECEIVING SECTION
2
11
PACKET TRANSMISSION SECTION

FIG. 2

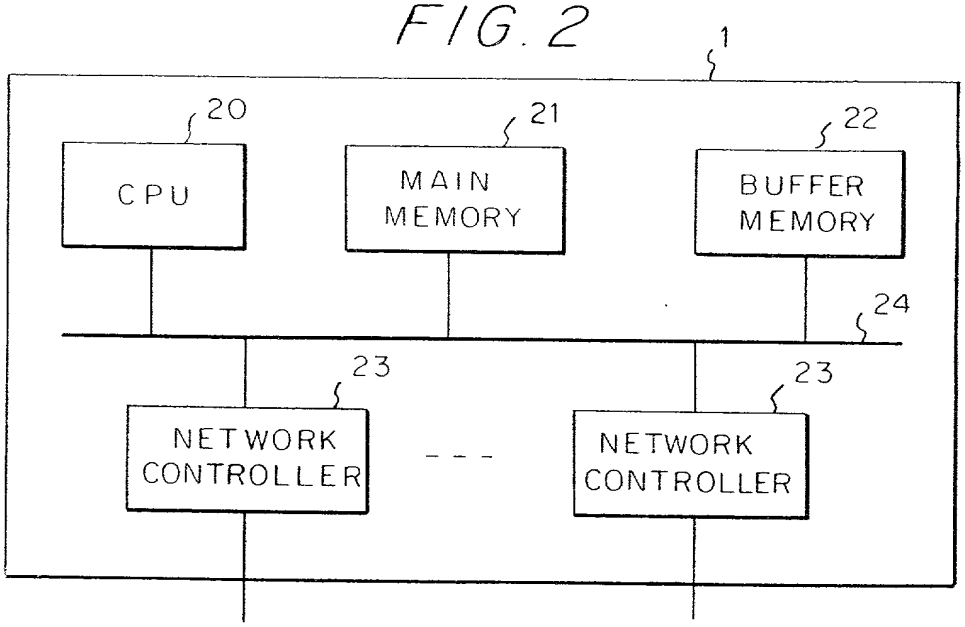

1
20
CPU
21
MAIN MEMORY
22
BUFFER MEMORY
24
23
NETWORK CONTROLLER
23
NETWORK CONTROLLER

FIG. 3

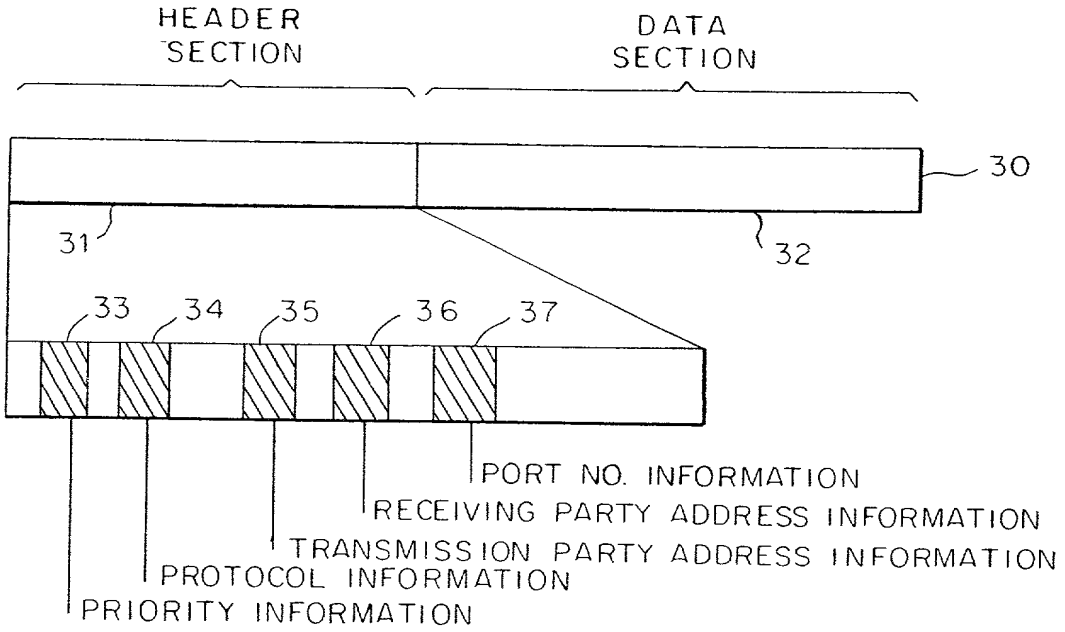

HEADER SECTION
DATA SECTION
30
31
32
33
34
35
36
37
PORT NO. INFORMATION
RECEIVING PARTY ADDRESS INFORMATION
TRANSMISSION PARTY ADDRESS INFORMATION
PROTOCOL INFORMATION
PRIORITY INFORMATION

FIG. 4

4

NO	RECEIVING PARTY ADDRESS	PROTOCOL	PORT NO.	POINTER INFORMATION
1	b	A	w	1 →
2	c	B	x	2 →

} TO MAPPING TABLE

FIG. 5a

8

TRANSMISSION PARTY ADDRESS	RECEIVING PARTY ADDRESS	PERMIT FLAG	POINTER INFORMATION
a	b	ON	1 →
a	c	ON	2 →
a	d	ON	3, 4 →
a	e	OFF	–

} TO MAPPING TABLE

FIG. 5b

9

IDENTIFIER	PROTOCOL PORT NO.	PRIORITY INFORMATION							
		0	1	2	3	4	5	6	7
1	<A, w>	OD	OD	OD	OD	1D	1D	1D	1D
2	<B, x>	3N	3N	3N	3N	3N	3N	3N	3N
3	<C, y>	2D	2D	3D	3D	3N	3N	3N	3N
4	<C, z>	2D	2D	3D	3D	3D	3D	3D	3D

O: PRIORITY CLASS LOW D: DISCARDED CLASS DROP

N: DISCARDED CLASS NON-DROP

FIG. 6

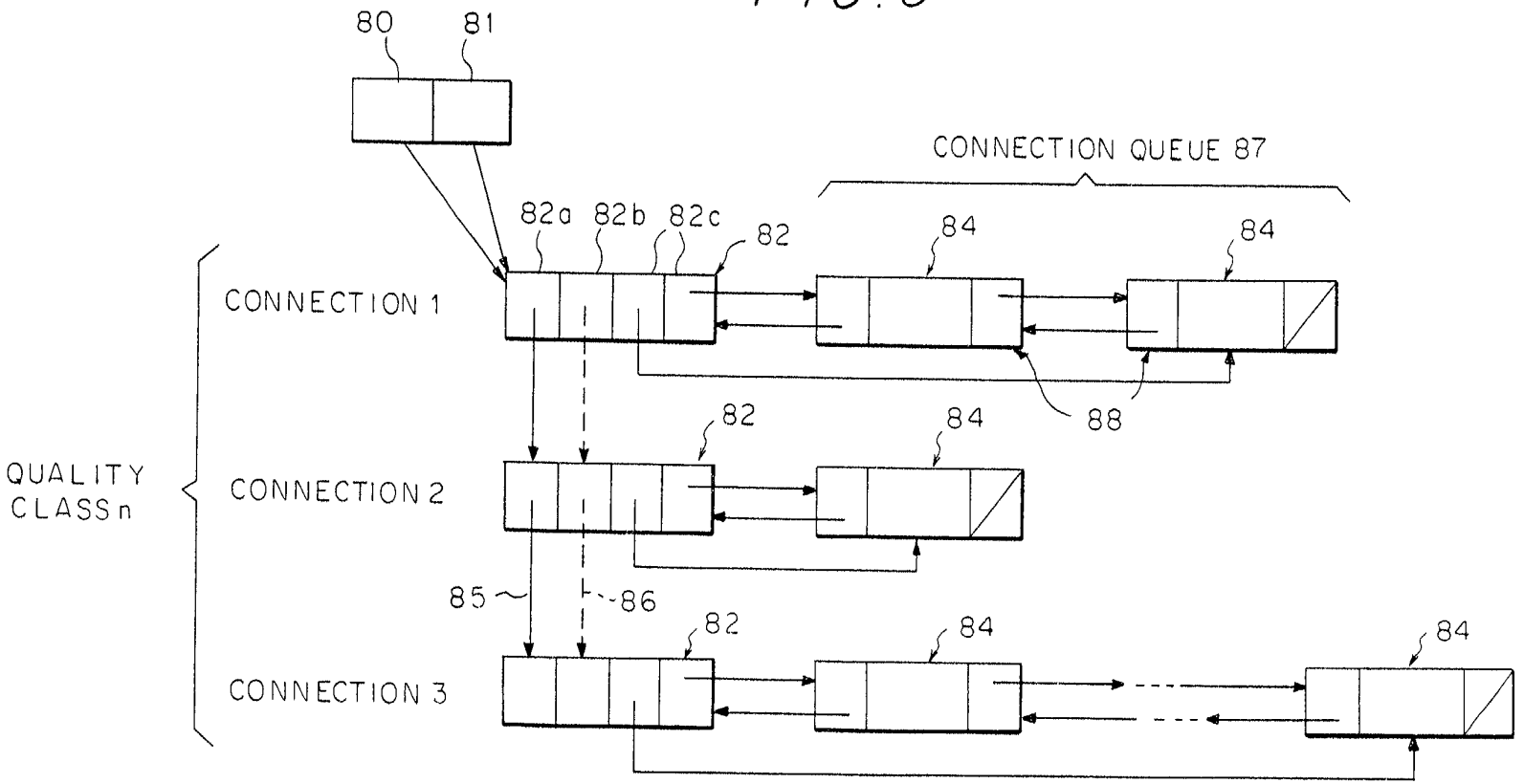

80
81
CONNECTION QUEUE 87
82a
82b
82c
82
84
84
CONNECTION 1
88
82
84
QUALITY CLASS n
CONNECTION 2
85
86
82
84
84
CONNECTION 3

FIG. 7

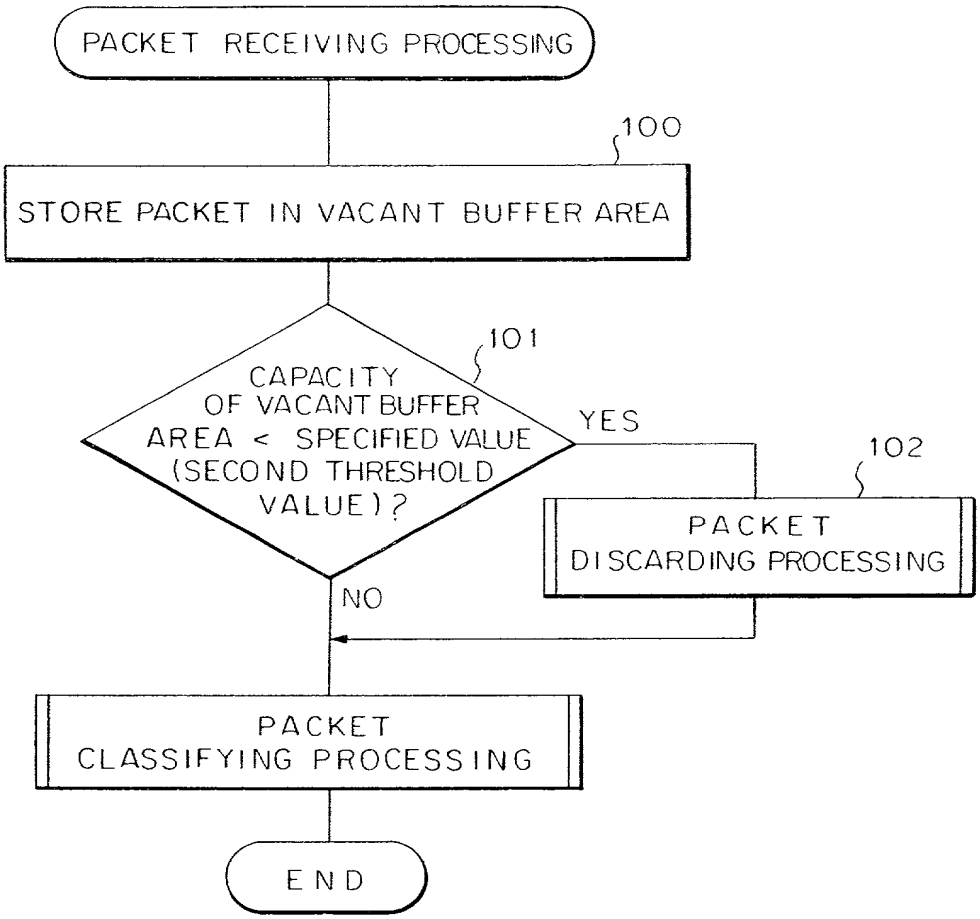

PACKET RECEIVING PROCESSING
100
STORE PACKET IN VACANT BUFFER AREA
101
CAPACITY OF VACANT BUFFER AREA < SPECIFIED VALUE (SECOND THRESHOLD VALUE)?
YES
102
PACKET DISCARDING PROCESSING
NO
PACKET CLASSIFYING PROCESSING
END

FIG. 8

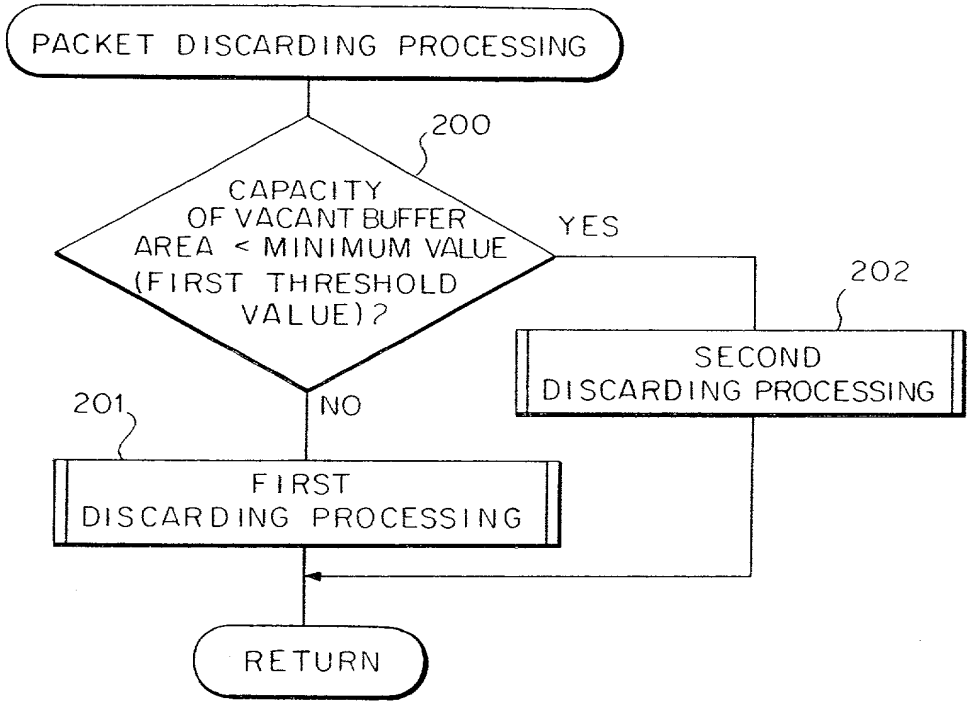

PACKET DISCARDING PROCESSING
200
CAPACITY OF VACANT BUFFER AREA < MINIMUM VALUE (FIRST THRESHOLD VALUE)?
YES
202
SECOND DISCARDING PROCESSING
NO
201
FIRST DISCARDING PROCESSING
RETURN

FIG. 9

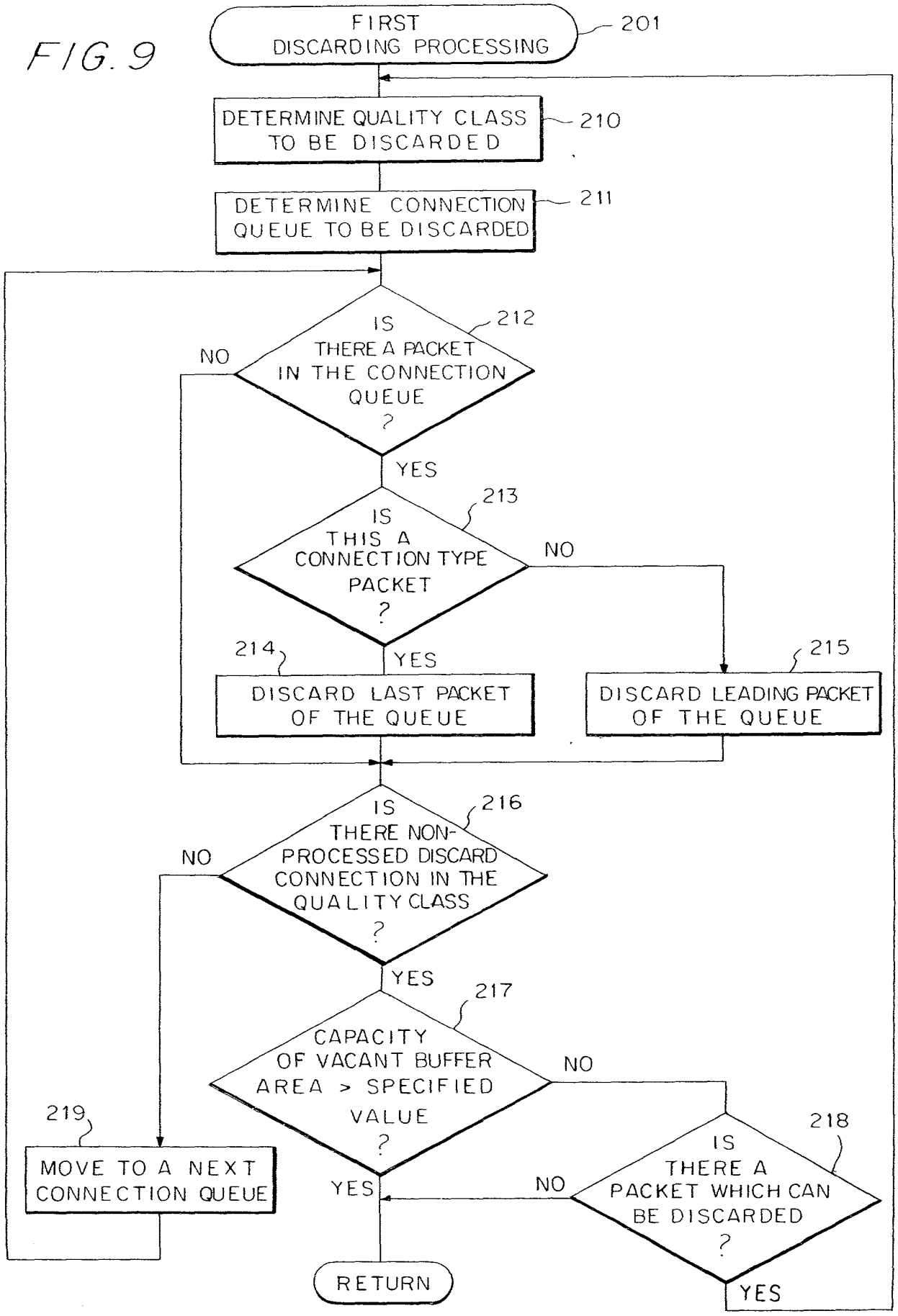

FIRST DISCARDING PROCESSING
201
DETERMINE QUALITY CLASS TO BE DISCARDED
210
DETERMINE CONNECTION QUEUE TO BE DISCARDED
211
IS THERE A PACKET IN THE CONNECTION QUEUE ?
212
NO
YES
IS THIS A CONNECTION TYPE PACKET ?
213
NO
YES
214
DISCARD LAST PACKET OF THE QUEUE
215
DISCARD LEADING PACKET OF THE QUEUE
IS THERE NON-PROCESSED DISCARD CONNECTION IN THE QUALITY CLASS ?
216
NO
YES
CAPACITY OF VACANT BUFFER AREA > SPECIFIED VALUE ?
217
NO
YES
IS THERE A PACKET WHICH CAN BE DISCARDED ?
218
NO
YES
219
MOVE TO A NEXT CONNECTION QUEUE
RETURN

FIG.10

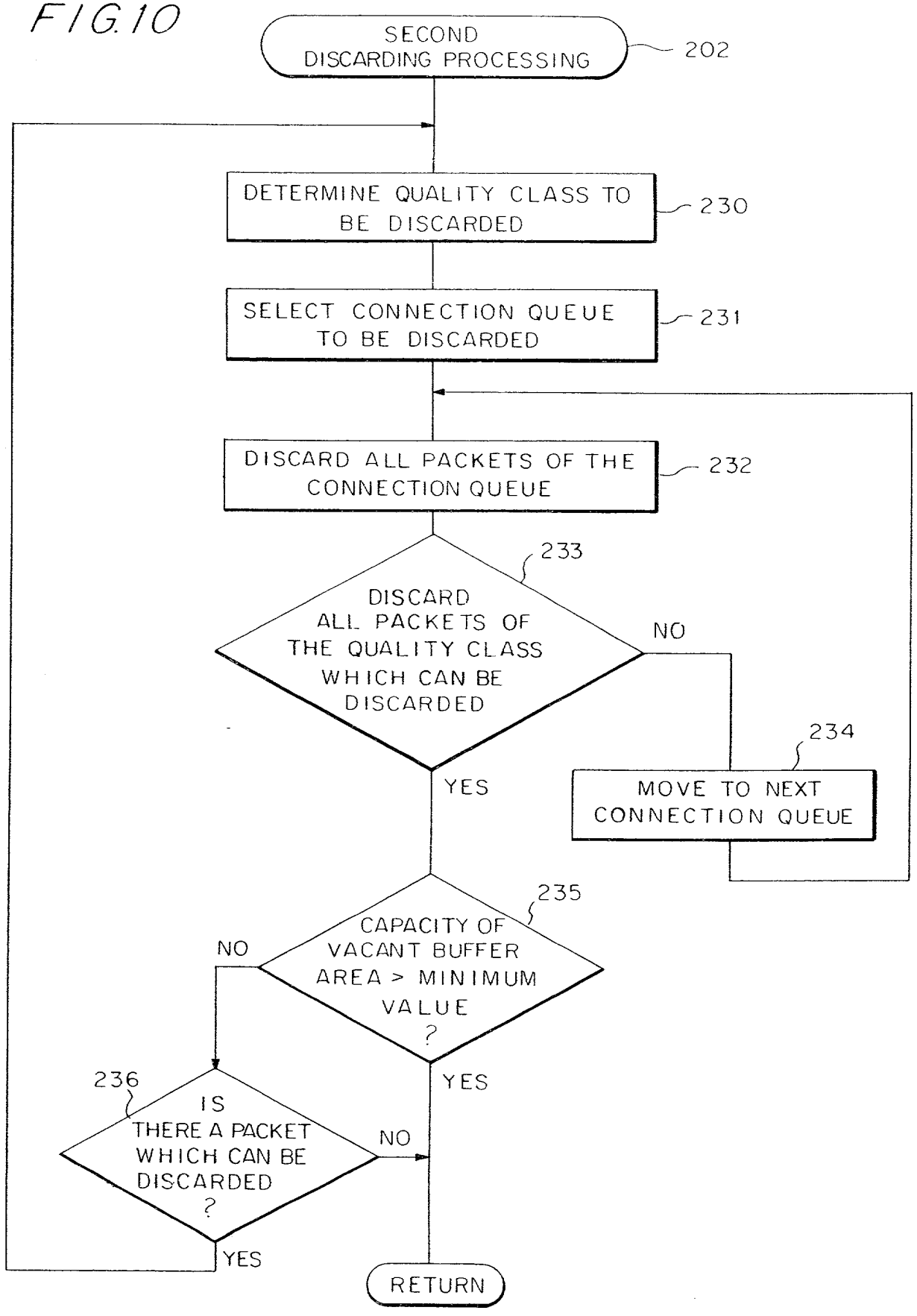

SECOND DISCARDING PROCESSING
202
DETERMINE QUALITY CLASS TO BE DISCARDED
230
SELECT CONNECTION QUEUE TO BE DISCARDED
231
DISCARD ALL PACKETS OF THE CONNECTION QUEUE
232
233
DISCARD ALL PACKETS OF THE QUALITY CLASS WHICH CAN BE DISCARDED
NO
YES
234
MOVE TO NEXT CONNECTION QUEUE
235
CAPACITY OF VACANT BUFFER AREA > MINIMUM VALUE ?
NO
YES
236
IS THERE A PACKET WHICH CAN BE DISCARDED ?
NO
YES
RETURN

FIG. 11

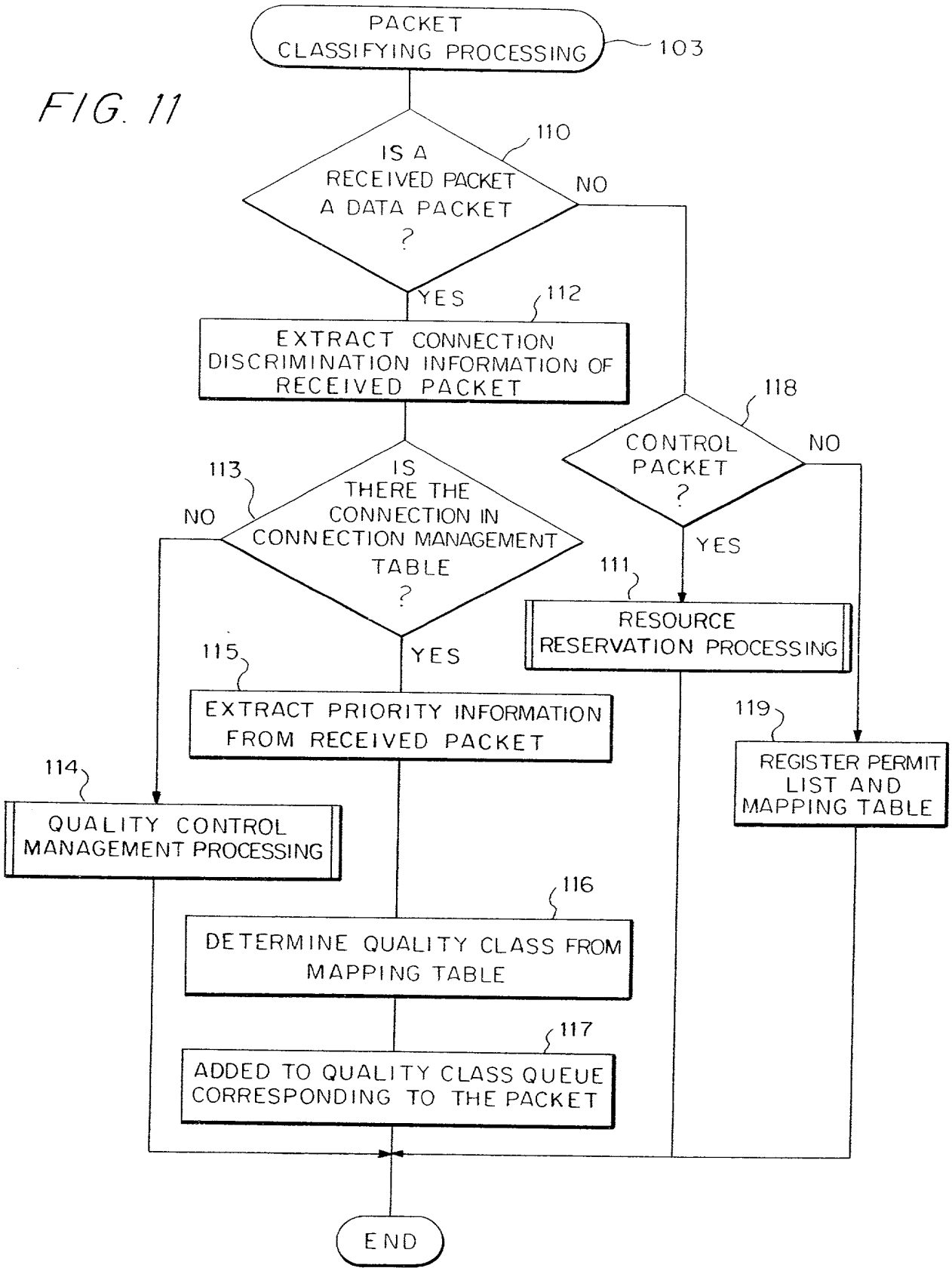

PACKET CLASSIFYING PROCESSING
103
IS A RECEIVED PACKET A DATA PACKET ?
110
NO
YES
EXTRACT CONNECTION DISCRIMINATION INFORMATION OF RECEIVED PACKET
112
CONTROL PACKET ?
118
NO
YES
IS THERE THE CONNECTION IN CONNECTION MANAGEMENT TABLE ?
113
NO
YES
RESOURCE RESERVATION PROCESSING
111
EXTRACT PRIORITY INFORMATION FROM RECEIVED PACKET
115
REGISTER PERMIT LIST AND MAPPING TABLE
119
QUALITY CONTROL MANAGEMENT PROCESSING
114
DETERMINE QUALITY CLASS FROM MAPPING TABLE
116
ADDED TO QUALITY CLASS QUEUE CORRESPONDING TO THE PACKET
117
END

FIG. 12

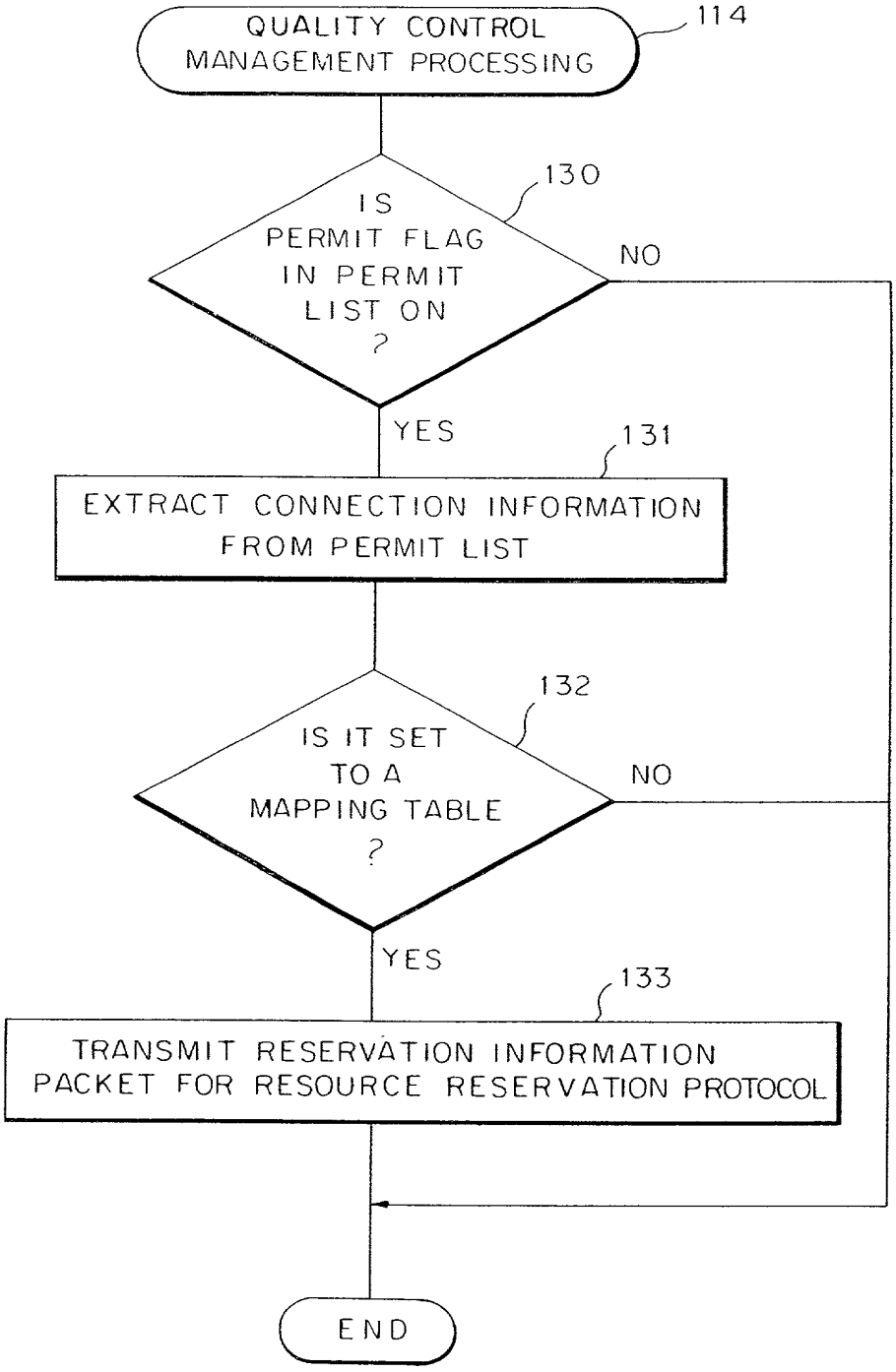

QUALITY CONTROL MANAGEMENT PROCESSING
114
IS PERMIT FLAG IN PERMIT LIST ON ?
130
NO
YES
EXTRACT CONNECTION INFORMATION FROM PERMIT LIST
131
IS IT SET TO A MAPPING TABLE ?
132
NO
YES
TRANSMIT RESERVATION INFORMATION PACKET FOR RESOURCE RESERVATION PROTOCOL
133
END

FIG. 13

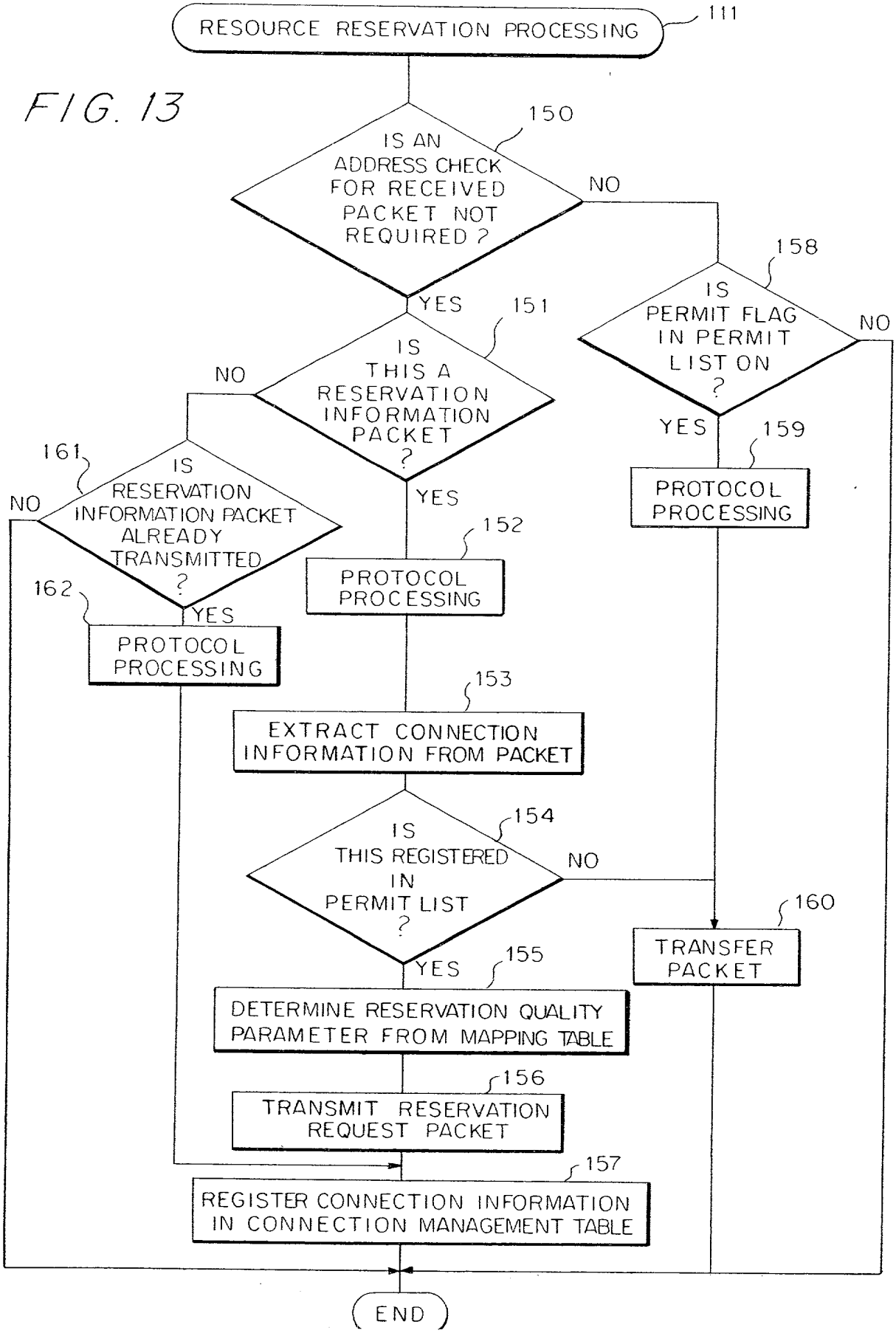

RESOURCE RESERVATION PROCESSING
111
IS AN ADDRESS CHECK FOR RECEIVED PACKET NOT REQUIRED ?
150
NO
YES
IS THIS A RESERVATION INFORMATION PACKET ?
151
NO
YES
IS PERMIT FLAG IN PERMIT LIST ON ?
158
NO
YES
PROTOCOL PROCESSING
159
IS RESERVATION INFORMATION PACKET ALREADY TRANSMITTED ?
161
NO
YES
PROTOCOL PROCESSING
162
PROTOCOL PROCESSING
152
EXTRACT CONNECTION INFORMATION FROM PACKET
153
IS THIS REGISTERED IN PERMIT LIST ?
154
NO
YES
TRANSFER PACKET
160
DETERMINE RESERVATION QUALITY PARAMETER FROM MAPPING TABLE
155
TRANSMIT RESERVATION REQUEST PACKET
156
REGISTER CONNECTION INFORMATION IN CONNECTION MANAGEMENT TABLE
157
END

FIG. 14

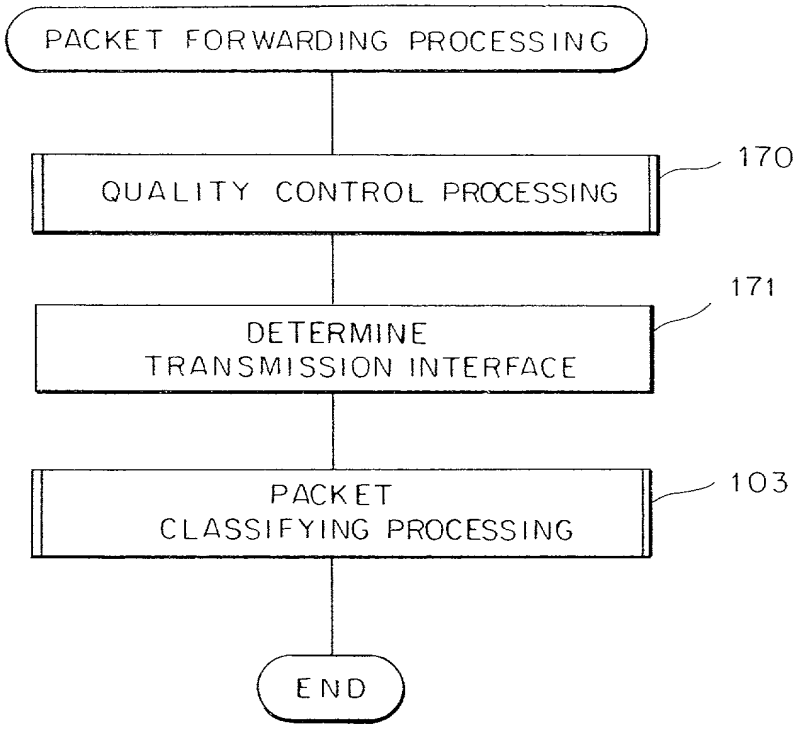
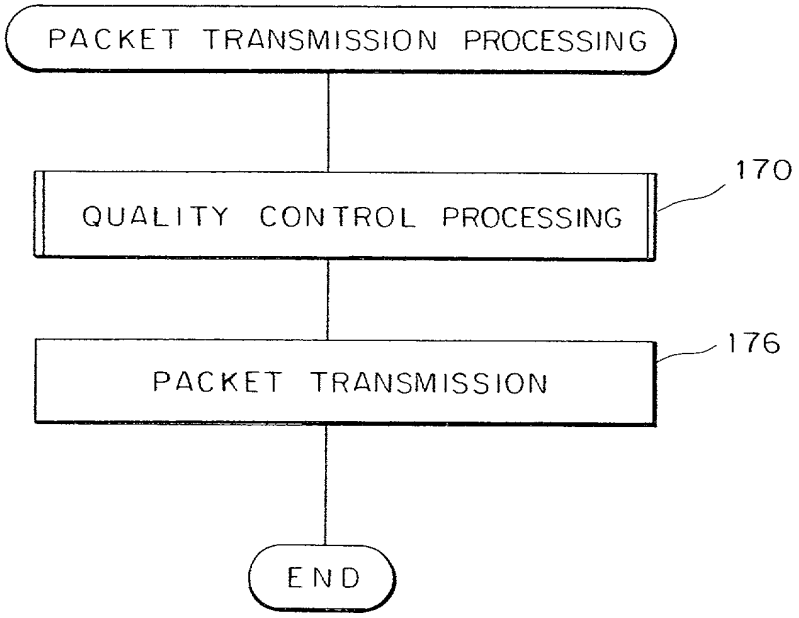

PACKET FORWARDING PROCESSING
QUALITY CONTROL PROCESSING
170
DETERMINE
TRANSMISSION INTERFACE
171
PACKET
CLASSIFYING PROCESSING
103
END

FIG. 15


PACKET TRANSMISSION PROCESSING
QUALITY CONTROL PROCESSING
170
PACKET TRANSMISSION
176
END

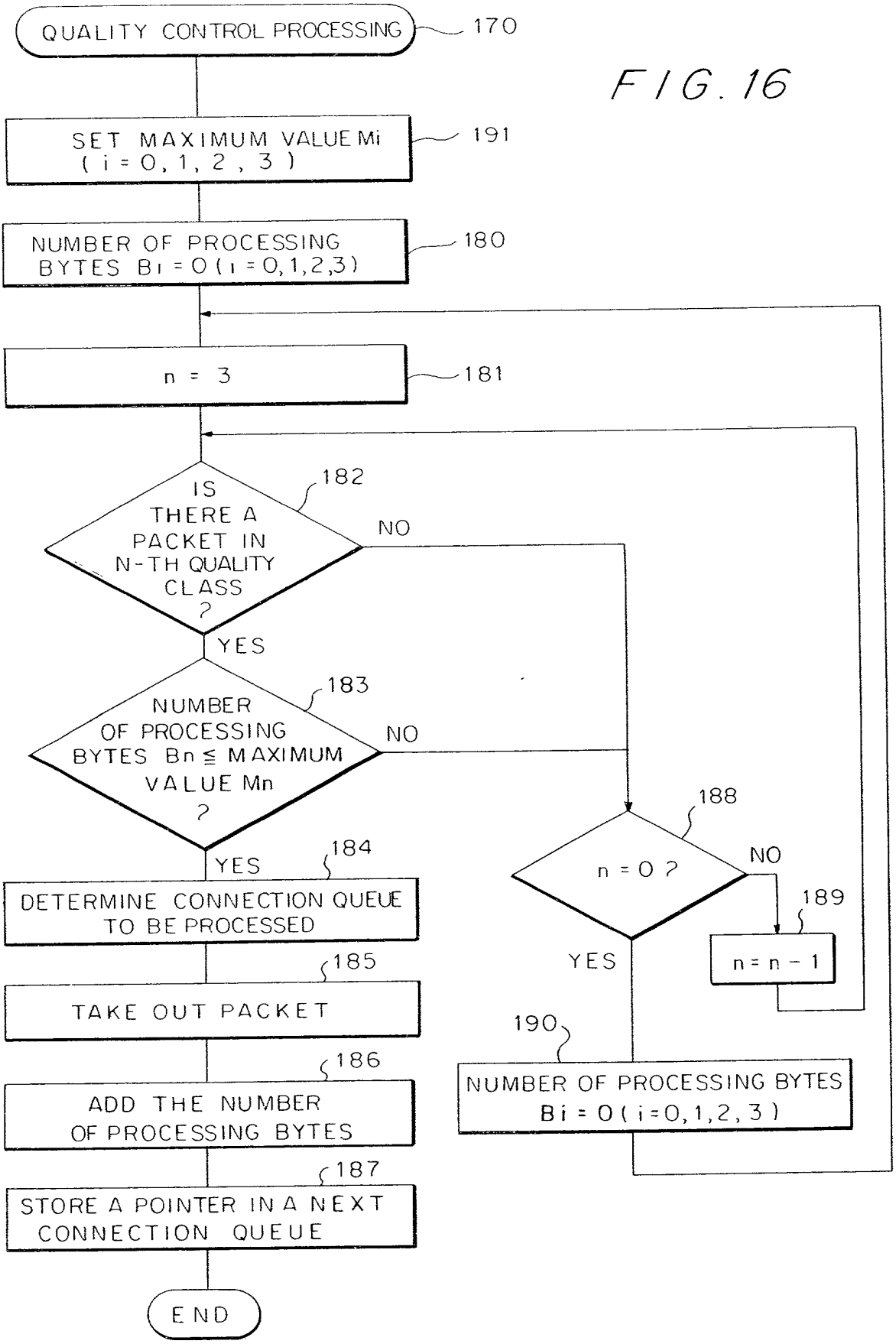

QUALITY CONTROL PROCESSING
170
SET MAXIMUM VALUE Mi (i = 0, 1, 2, 3)
191
NUMBER OF PROCESSING BYTES Bi = 0 (i = 0,1,2,3)
180
n = 3
181
IS THERE A PACKET IN N-TH QUALITY CLASS ?
182
NO
YES
NUMBER OF PROCESSING BYTES Bn ≦ MAXIMUM VALUE Mn ?
183
NO
YES
DETERMINE CONNECTION QUEUE TO BE PROCESSED
184
TAKE OUT PACKET
185
ADD THE NUMBER OF PROCESSING BYTES
186
STORE A POINTER IN A NEXT CONNECTION QUEUE
187
END
n = 0 ?
188
NO
YES
n = n - 1
189
NUMBER OF PROCESSING BYTES Bi = 0 (i=0,1,2,3)
190

FIG. 16

FIG. 17

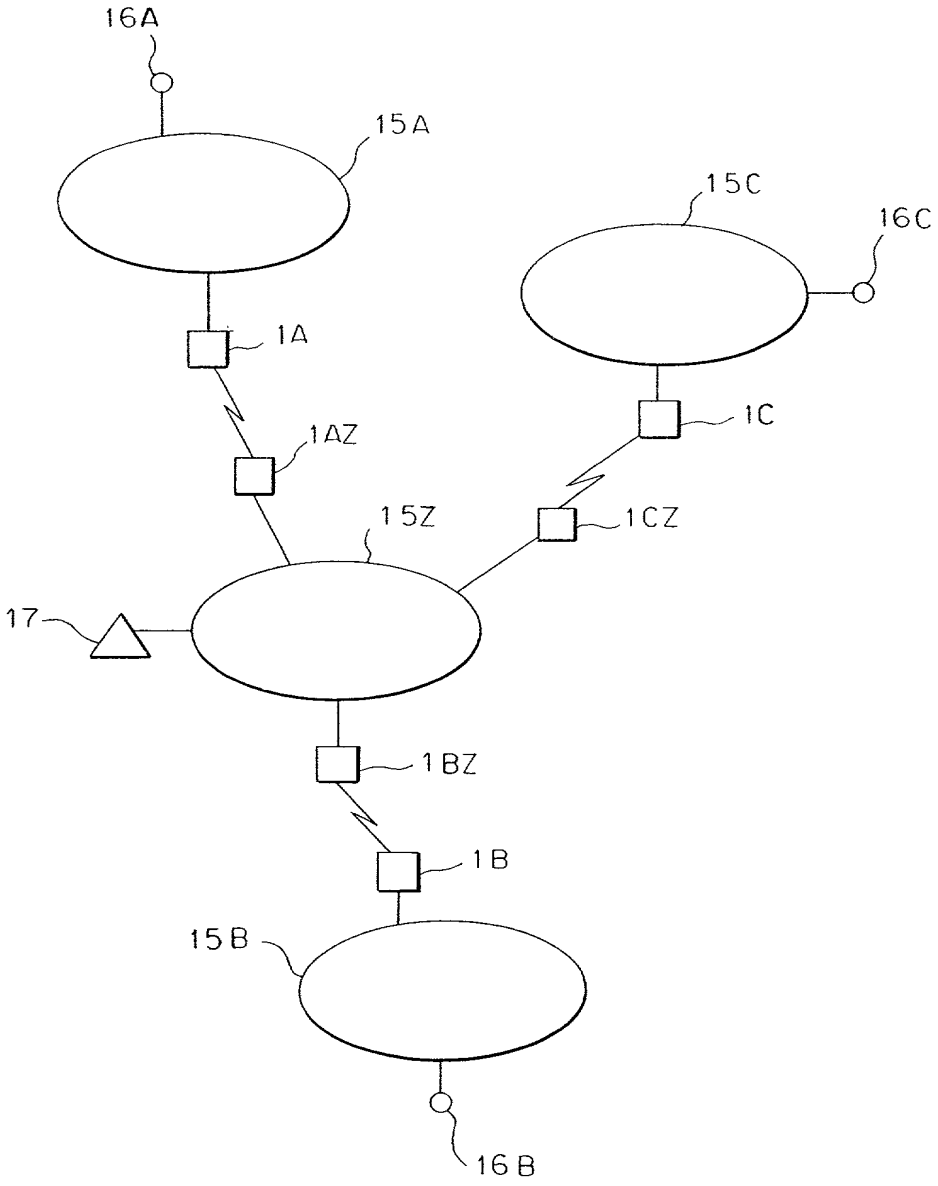
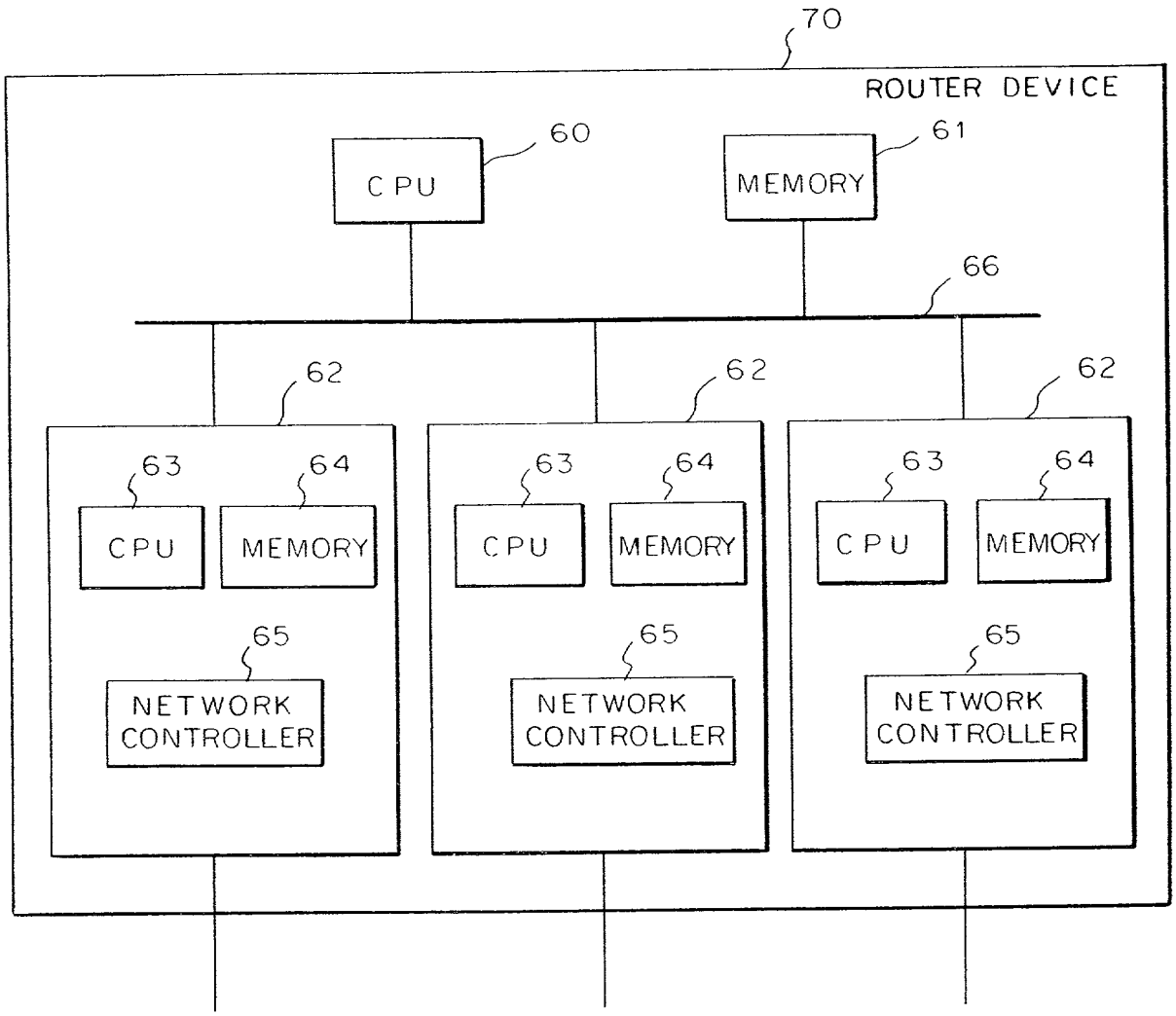


FIG. 18


70
ROUTER DEVICE
CPU
60
MEMORY
61
66
62
62
62
63
64
CPU
MEMORY
63
64
CPU
MEMORY
63
64
CPU
MEMORY
65
NETWORK CONTROLLER
65
NETWORK CONTROLLER
65
NETWORK CONTROLLER